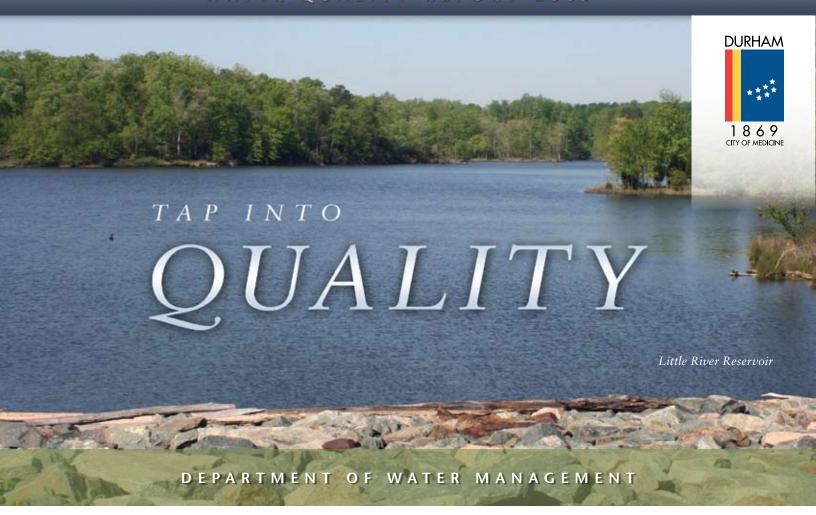
WATER QUALITY REPORT 2009





CITY OF DURHAM

Department of Water Management 101 City Hall Plaza Durham, NC 27701

www.durhamnc.gov



EN ESPAÑOL Este folleto tiene información importante acerca de la calidad del agua que provee la Ciudad de Durham. Si necesita más información acerca del contenido de este Folleto, el personal de El Centro Hispano puede ayudarle 201 W. Main Street # 100 Durham NC, 27701, teléfono **919-687-4635**.

Dear Durham Water Customers,

The dictionary defines "normal" as "the average or mean" or "the standard." The year of 2009 challenged our notion of "normal" as it presented its own set of ordeals and opportunities for the Department of Water Management and the rest of the City of Durham and surrounding areas. We continue to face challenges brought about by the current economic climate, yet there are still some positives to embrace as we adjust to a *New Normal*.

Technology has changed dramatically over the last few years as noted in the use of Facebook® and other social media outlets. The speed at which customers get news and the tools that we need to use to communicate information to our customers is constantly changing. We have learned that we can't rely exclusively on standard print editions of local newspapers to deliver our message and critical information to customers. In addition to using the City website and the *Citizens' Newsletter* insert in the water bill, Water Management is already utilizing Facebook and Twitter to disseminate conservation and water efficiency information to customers choosing to take advantage of these communication tools.

Harnessing technology to better serve our customers will continue to be a focus of the department. Within the water system, this provides opportunities to better monitor the system from beginning to end – starting with the supply. With SCADA (Supervisory Control and Data Acquisition) fully implemented, staff can monitor the distribution system and the water treatment processes remotely 24/7, a tool which also offers improved security of the system.

But beyond the processes, technology allows for enhancements to the utility billing system such as:

- Emailing water/wastewater bills to customers
- Providing "group" billing to customers with several accounts

- Increased frequency of meter reading as the Automated Meter Reading (AMR) project is implemented
- Using laptops in the field to effectively deploy staff and increase responsiveness with the added "green" benefit of decreasing vehicle emissions.

Our normal rain/precipitation patterns are expected to change as well. Experts are predicting more variability in rain events - longer stretches between events but more intense events when they do occur. This leads us to evaluate how we move and store water. Adapting to the New Normal also means increased collaborative efforts with our neighbors. The interconnections we have in place with Cary, OWASA and Raleigh provide us a level of security in providing water in emergency situations. Another example of regional cooperation and collaboration is the Jordan Lake Partnership (JLP), made up of entities in and around the Jordan Lake watershed. In this new spirit of collaboration, the JLP is committed to proactively partnering to ensure that communities in the region will be able to meet their water supply needs well into the future. This New Normal will further ensure the economic viability of the triangle in the coming decades.

We hope the information included in this annual edition of *Tap in to Quality* will provide helpful information about the water you rely on for your daily needs. In closing, on behalf of the Department of Water Management, I would like to thank you – our customers – for your cooperation and support.

Regards,

Don Greeley, Director

Questions?

Questions regarding the information in this report should be directed to Water Management staff at the Brown Water Treatment Plant, **560-4362**. For information on water conservation or to arrange a tour of facilities, call **560-4381**. Call **560-4411** for all billing questions. For information about City operations and services, contact **Durham One Call** at **560-1200**.

Notice Under the Americans with Disabilities Act

A person with a disability may receive an auxiliary aid or service to effectively participate in city government activities by contacting the ADA Coordinator, voice 919-560-4197, fax 560-4196, TTY 919-560-1200, or ADA@durhamnc.gov, as soon as possible but no later than 48 hours before the event or deadline date.

Aviso bajo el Acto de Americanos Discapacitados — Una persona con una discapacidad puede recibir asistencia o servicio auxiliar para participar efectivamente en actividades del gobierno de la ciudad con ponerse en contacto con el Coordinador de ADA, buzón de voz 919-560-4197, fax 919-560-4196, TTY 919-560-1200, o ADA@durhamnc.gov, lo más antes posible pero no menos de 48 horas antes del evento o fecha indicada.

The New Normal

Water providers across the globe face a number of challenges on daily basis, from routine water line breaks to dramatic water supply emergencies. Frequent changes in technology, climate, security, population, and the economy have created a strong sense of uncertainty. Normal conditions are no longer predictable. This uncertainty has become the "new normal" for our community, the nation, and even the world.

One of the most troubling changes Durham has seen in the last few years is what appears to be an increase in the frequency of drier-than-normal weather. It's hard to deny that the Earth's climate is changing and will continue to change in the coming decades. At the local level, the effects of climate change are rather unclear. Unexpected extremes, such as the unprecedented drought of several years ago, are likely to pose significant challenges to the City and the region. At the time of this writing, both of Durham's lakes are full, but as the last several years have shown, dry conditions can appear rapidly and dramatically. We can no longer assume that

existing water supplies, once thought to be abundant, will meet the demands of our growing community. Sensible management of existing supplies and planning for future expansion is essential as we try to anticipate and lessen the impacts of increasing natural variability.

As we adapt to this new normal, the Department of Water Management is focused on efficient resource planning. City staff is making efforts to predict future water needs, understand how and why climate may change in the future, and how to best protect and manage the resource on which the Durham community depends. The Department of Water Management is continuing to promote the efficient use of water through our *Durham Saves Water* campaign and working with the Jordan Lake Partnership as a model of regional cooperation in water supply planning. Without doubt, the next few years will continue to bring new challenges, but the Department stands ready to offer new solutions and programs to better serve our community.



Tap Water Compliance History

The City of Durham is required to test for more than 100 different constituents in the drinking water, and the compounds listed in the tables in this edition of *Tap Into Quality* represent just a fraction of the total number of required and voluntary analyses. For 2009, all detected substances except Haloacetic Acids (HAAs) were below the levels allowed by the Environmental Protection Agency (EPA).

Durham experienced a system-wide exceedance of one of the disinfection by-products that the City monitors, HAAs. This exceedance occurred when several factors combined to push the four-quarter running average over the maximum contaminant level allowed by EPA. Disinfection by-products (DBPs) develop when naturally occurring organic materials react with residual disinfectants in the distribution system; the production of DPBs increases with higher temperature and increased water age. During the last three quarters of 2008, elevated levels of HAAs formed in the distribution system due to historically high amounts of organic materials in both of our water supply lakes as a result of the 2007-2008 drought. Department of Water Management staff took a number of steps to optimize the water treatment process which has resulted in significantly lowering HAAs in the water system. Public notification of this exceedance occurred in April 2009. Customers should be reassured that they were at minimal risk of harmful health effects. To put this in perspective, one would need to drink two liters of water with elevated levels of these compounds every day for 70 years to show any negative health effects. For more information about this particular issue, customers are encouraged to visit the City's website at http://www.durhamnc.gov or call (919) 560-4381.

Durham Water Sources

The sources of drinking water - both tap and bottled - include rivers, lakes, streams, ponds, reservoirs, springs and wells. Durham is fortunate to have two high quality sources of raw (untreated) water. Lake Michie, built in 1926, has reliably supplied approximately 19 million gallons per day (MGD) for over 80 years. However, to meet increased water demands due to development in the mid 1980s, the City constructed the Little River Reservoir and Dam in 1988 to provide an additional 18 MGD of water. Together, these sources provide a combined capacity (safe yield) of 37 MGD. Additional water sources included Jordan Lake and Teer Quarry. In 2002, the City of Durham obtained an allocation of approximately 10 million gallons of water per day from Jordan Lake, another local high quality water source. Currently access to the City's allocation from Jordan Lake is via the Town of Cary's water system; however, Durham plans to collaborate with its Jordan Lake Partners to construct a new intake at the lake. Emergency supplies are available from both Teer Quarry and the Eno River.

Durham owns and operates two water treatment plants, the Williams Water Treatment Plant (located on Hillandale Road) and the Brown Water Treatment Plant (located on Infinity Road) which

provide potable water to Durham city and county customers. Water can be transferred from the two supply lakes to the two treatment plants by gravity flow, hydropower or electric power. Terminal reservoirs at each of the water treatment plants hold about a two-to-three day supply of raw water.

Source Water Information Available

The North Carolina Department of Environment and Natural Resources (DENR), Public Water Supply (PWS) Section, Source Water Assessment Program (SWAP) conducted assessments for all drinking water sources across North Carolina in 2005. The purpose of the assessments was to determine the susceptibility of each drinking water source (well or surface water intake) to Potential Contaminant Sources (PCSs). The results of the assessment are available in SWAP Assessment Reports that include maps, background information and a relative susceptibility rating of Higher, Moderate or Lower. Since these reports are over 100 pages each, DENR requires only that water providers present the basic information from the report in each year's water quality report.

The relative susceptibility rating of each source for the City of Durham was determined by combining the contaminant rating (determined by the number and location of PCSs within the assessment area) and the inherent vulnerability rating (i.e., characteristics or existing conditions of the watershed and its delineated assessment area.). The assessment findings are summarized in the table below:

SUSCEPTIBILITY OF SOURCES TO POTENTIAL CONTAMINANT SOURCES (PCSs)

SOURCE NAMESUSCEPTIBILITY RATINGSWAP REPORT DATELittle River ReservoirModerateMarch 18, 2005Lake MichieModerateMarch 18, 2005

The complete SWAP Assessment report for the City of Durham (PWSID# 03-32-010) may be viewed on the Web at: http://www.deh.enr.state.nc.us/pws/swap. Customers may order a printed copy of this report by submitting a written request to: Source Water Assessment Program – Report Request, 1634 Mail Service Center, Raleigh NC 27699-1634, or emailing a request to swap@ncmail.net. Please indicate the system name (City of Durham), PWSID (03-32-010), and provide your name, mailing address and phone number. If you have any questions about the SWAP report please contact the Source Water Assessment staff by phone at 919-715-2633.

It is important to understand that a susceptibility rating of "higher" *does not* imply poor water quality, only the systems' potential to become contaminated by PCS's in the assessment area. The City's "moderate" rating indicates a lesser potential for contamination.

2009 CITY OF DURHAM: WATER QUALITY SUMMARY

SUBSTANCE AND UNIT OF MEASUREMENT	MAX. LEVEL DETECTED AND RANGE	VIOLATION YES/NO	MAX. LEVEL ALLOWED (MCL)	IDEAL GOAL (MCLG)	POTENTIAL SOURCE(S) OF SUBSTANCE
REGULATED AT THE TREATMEN	T PLANTS				
Fluoride mg/L	0.99 (0.46 – 0.99)	NO	4.0	4.0	Naturally occurring mineral; also added to promote dental health
Nitrate mg/L (as Nitrogen)	0.34 (< 0.10 – 0.34)	NO	10.0	10.0	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Turbidity NTU	0.11 (0.09 – 0.11)	NO	т	N/A	Soil runoff
Turbidity, % of monthly samples ≤ 0.3 NTU	100%	NO	95%	100%	
Total Organic Carbon mg/I (TOC) Results show the range of TOC in both source and treated water. Durham's processes remove more than the required 50%.	Average Removal 67% Source 8.81 (6.34 –12.16) Treated 2.9 (2.19 – 5.02)	NO	NR	TT 50% removal	Naturally present in the environment
Alpha emitters pCi/L (Samples collected & analyzed February 2008)	None detected (no range)	NO	15	0	Erosion of natural deposits
Beta/photon emitters pCi/L (Samples collected & analyzed February 2008)	None detected (no range)	NO	50	0	Decay of natural and man-made deposits
REGULATED AT THE CUSTOMER	'S TAP				
Copper mg/L (EPA required triennial sampling conducted in September 2007)	< 0.05 (90th percentile)	NO	AL=1.3	1.3	Corrosion of household plumbing systems
Lead mg/L (EPA required triennial sampling conducted in September 2007)	<0.003 (90th percentile)	NO	AL=0.015	0	Corrosion of household plumbing systems
regulated in the distribution	on system				
Chloramines mg/L (as Cl ₂)	2.9 RAA (Running Annual Average)	NO	MRDL 4.0	MRDLG 4.0	Water additive to control microbes
Chlorine mg/l	2.3 RAA	NO	MRDL 4.0	MRDLG 4.0	Disinfectant to control microbes; used only in March of each year during system burnout.
Total Coliform Bacteria (as a percent)	0% positive	NO	< 5% positive	0% positive	Naturally present in the environment
Five Haloacetic Acids (5HAA) μg/L	36.4 – System Average (22.0 – 48.0)	YES*	60	0	By-product of drinking water disinfection
Total Trihalomethanes (TTHM) μg/L	45.3 – System Average (32.0 – 69.0)	NO	80	0	By-product of drinking water disinfection
UNREGULATED SUBSTANCES					
Sodium mg/L	33.4 (16.5 – 33.4)	NO	NR	20 DWEL	Naturally occurring element in soil and water
Sulfate mg/L	56.2 (43.7 – 56.2)	NO	NR	250	Naturally occurring mineral in soil

^{*} The exceedance occurred in the first quarter of 2009, based on results from the four-quarter running average. This number incorporates data from the 2nd, 3rd, and 4th quarter of 2008. All sample results for HAAs in 2009 were below the maximum contaminant level of 60 micrograms per liter. See Tap Water Compliance History on page 3 of this report for details.

The City of Durham (PWSID # 03-32-010) routinely monitors for over 150 contaminants in your drinking water according to Federal and State laws. The table below lists all the drinking water contaminants that were *detected* during **testing conducted from January 1 through December 31, 2009**. The EPA or the State requires water providers to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of the data, while representative of the water quality, is more than one year old.

PHYSICAL AND MINERAL CHARACTERISTICS

SUBSTANCE, UNIT OF MEASUREMENT	ANNUAL AVERAGE
pH, standard units (range)	7.5 – 7.7
Alkalinity, mg/L	23.0
Calcium, mg/L	5.2
Chloride, mg/L	12.1
Conductivity, micromhos/cm	215.0
Hardness - Calculated, mg/L	21.0
Hardness - EDTA, mg/L	
Orthophosphate, mg/L (as phosphorus)	0.93
Potassium, mg/L	2.1
Total Solids, mg/L	136.0
Zinc, mg/L	0.74

KEY TO ABBREVIATIONS IN TABLE			
mg/L	milligrams per liter, or parts per million		
MCL	Maximum Contaminant Level; the highest level of a contaminant that is allowed in drinking water		
MCLG	Maximum Contaminant Level Goal; the level of a contaminant in drinking water below which there is no known or expected risk to health		
MRDL	Maximum Residual Disinfectant Level; the highest level of a disinfectant allowed in drinking water		
MRDLG	Maximum Residual Disinfectant Level Goal; the level of a drinking water disinfectant below which there is no known or expected risk to health		
AL	Action Level; the concentration of a contaminant, which if exceeded, triggers treatment or other requirements that a water system must follow. Action Levels are reported at the 90th percentile for homes at greatest risk		
TT	Treatment Technique; a required process intended to reduce the level of a contaminant in drinking water		
μg/L	micrograms per liter, or parts per billion		
pCi/L	Picocuries per liter; a measure of the radioactivity in water		
NTU	Nephelometric Turbidity Units; measures the clarity or cloudiness in water		
N/A	Not Applicable		
NR	Not Regulated		

Special Note: MCLs are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having a potentially adverse health effect.

North Carolina guidance Drinking Water Equivalent Level

Less Than

DWEL

SPECIAL CONCERNS

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial organisms are available from the Safe Drinking Water Hotline at 800-426-4791.

What is Cryptosporidium?

Cryptosporidium (Crypto) is a microbial parasite which occurs naturally in rivers and lakes throughout the United States and comes from animal wastes. Controlling and minimizing development and animal activities in our watershed reduces the occurrence of Crypto in raw water. This microscopic organism, while a concern for water providers, is typically very effectively removed by the water treatment process combination of filtration, sedimentation and disinfection. However, when ingested, Crypto can cause fever, diarrhea, and other gastrointestinal symptoms. As part of the EPA's Information Collection Rule, Durham monitored both supply lakes for *Crypto*. In the fall of 2006, Durham began monthly monitoring for Crypto at each of our water supply lakes to ensure the continuing safety of the raw water, as well as to comply with the EPA Long Term Two Enhanced Surface Water Treatment Rule (LT2ESWTR). The results of the monitoring will determine whether or not additional treatment is needed to remove these parasites from the drinking water. Crypto has not been detected in any monitoring events to date.

Lead and Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Department of Water Management is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead or the City's Lead Information page at http://www.durhamnc.gov/departments/wm/lead.cfm.

How does water travel?

As water travels over the surface of the land or through the ground, minerals and other materials are dissolved naturally. Water can also pick up substances that are the result of animal or human activity. Source water may contain microbial contaminants, such as viruses and bacteria; inorganic contaminants such as salts and metals; pesticides and herbicides from agriculture or urban runoff; organic chemicals from industrial processes or run-off; and radioactive contaminants which can be naturally occurring.

How is Durham's water treated?

Both the Williams Water Treatment Plant (built in 1917, current capacity of 22 MGD) and the Brown Water Treatment Plant (built in 1977, current capacity of 30 MGD) operate using optimized conventional water treatment processes. At the water treatment facilities, raw water is mixed with caustic to adjust the pH and ferric sulfate to coagulate particles. After mixing, the water flows into settling basins where the particles stick together (coagulation), become heavy, and settle to the bottom of the basins (flocculation). After disinfection through chloramination, the clearer water flows through filters, removing the remaining particles. Fluoride is then added prior to distribution to our customers. In 2009, Durham customers used an average of 26.08 million gallons per day.

What are plans for future upgrades?

Several years ago, restoration projects at the historic Williams Water Treatment Plant addressed a number of exterior issues. The Department of Water Management is currently in the process of rehabilitating portions of the interior of the facility, including an update to the stormwater collection system. Future plans include revitalizing the 1917 office wing of the plant.

There are also a number of ongoing projects at the Brown Water Treatment Plant. Several filters are being rehabilitated and an interim backwash treatment process has been developed. A new 30 million gallons per day finished water pump is being installed, and new drives are being installed to serve the existing finished water pumps. Further, the electrical supply system is being revitalized and upgraded.

Additionally, both facilities are in the design stage of a regulatory compliance initiative focused on meeting both the City's future water treatment quality and capacity requirements. These initiatives include the addition of a modern supervisory control and data acquisition (SCADA) system and additional process trains to ensure that the City is in full compliance with the Stage 2 Disinfectants/Disinfection Byproducts Rule and the LT2ESWTR which become effective in 2012.

What can you expect of your drinking water?

In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants

in water provided by public water systems. The Food and Drug Administration establishes regulations for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 800-426-4791.

WHY CONSERVE?

People often wonder why water conservation is important when water supplies are adequate, especially because conservation has often been considered a temporary response to a water shortage. This narrow view of conservation no longer serves our community, nation, and world. Water is essential to life. With population growth (and the related increase in business and industry) comes a greater need for water, despite the fact that water continues to be a limited resource. It is becoming all too apparent that working to protect our local and global water supplies is essential, and everyone needs to play a role in that process.

Protecting a Limited Resource

Although the earth's surface is predominately covered by water, most is not drinkable. Only 3% of the water on the planet is



fresh water. Of this water, two-thirds of it is stored in ice caps and glaciers and is otherwise unavailable to us. That only leaves 1% of all the water in the world that is available for drinking.

Water Efficiency and Energy Conservation Go Hand-in-Hand

In addition to saving water and lowering bills, using water wisely can also help save energy. Using water efficiently reduces the amount of energy that is used to transport, treat, and distribute water to our community. And of course, reducing hot water usage saves energy in our homes and businesses.

Protecting the Environment

Reducing our water use in our homes and businesses helps save a precious natural resource. By conserving water, we can avoid overdrawing our reservoirs, maintain future water supplies, and leave more water in the natural environment for wildlife and the health of our local and global ecosystems.

WATER HEROES

Each year, the Department of Water Management sponsors a water conservation poster contest for local students, grades K through 8. The theme for 2009 was Water Heroes. Water Management received 181 posters, proving that Durham's students are indeed water heroes in their own right. Congratulations to our 2009 winners:

Grade	es K – 2	
Eric Wennerstrom	2nd Grade	Morehead Montessori
Fredricka Little	2nd Grade	Lakewood Elementary
Isabel Moreno-Jaimes	2nd Grade	Morehead Montessori
		Fredricka Little 2nd Grade

		Grades 3 – 5	
1st	Manriki Gagnon	4th Grade	Durham Academy
2nd	Kiah M. Stith	4th Grade	Durham Academy
3rd	Olivia Hall	4th Grade	Durham Academy
		Grades 6 – 8	

	Grau	C 0 0	
1st	Kevin Schanze	8th Grade	Voyager Academy
2nd	Rohniah Bustillo	8th Grade	Voyager Academy
3rd	Brianna Christine Delargy	8th Grade	Voyager Academy

Additional congratulations go to those students who also won at the statewide Water Conservation poster contest, sponsored by the NC American Water Works – Water Environment Association. Both Kevin Schanze and Manriki Gagnon won First Place for their grade divisions. Rohniah Bustillo and Kiah Stith won second place for their grade divisions. Brianna Delargy, Olivia Hall, and Eric Wennerstrom won Third Place for their grade divisions.



Eric Wennerstrom 1st Place, Grades K-2



Manriki Gagnon 1st Place Grades 3-5



Kevin Schanze 1st Place Grades 6-8

Saving Money

By using water efficiently, customers can reduce their water and sewer (and other utility) bills. Water conservation can also help save the City money by reducing capital and operating costs. It may even help to decrease and/or defer the need for costly water and wastewater system expansions.

How to Save Water

There are many simple ways to save water. You can start by taking shorter showers, turning the water off when you brush your teeth, and fixing leaks. If you want to take it further, think about collecting rain water for your garden, planting low-water use plants, and replacing older toilets with High Efficiency models. We encourage you to visit http://www.DurhamSavesWater.org for 111 tips on ways to use water wisely and information about Durham's WaterSenseSM toilet rebate program. Remember, there are a number of ways to save water, and they all start with you.

Stay up to date with the latest news from the Conservation Program: Find "Durham Saves Water" on Facebook® and follow us on Twitter.

Community Participation

How can you be involved in decisions regarding Durham's water system or other City issues? Citizens are welcome to attend regularly scheduled meetings of Durham's City Council. Council meetings are held the first and third Monday of each month at 7 p.m. City Council members also have regular work sessions to prepare for Council meetings. These sessions occur on Thursdays - two weeks prior to each regular Council meeting. Work sessions are held at 1 p.m. in the Council's Committee Room on the second floor of City Hall. Council meetings are held at City Hall in the Council Chambers on the first floor. Check the City's Web site to confirm meetings at http://www.durhamnc.gov. City Hall is located in downtown Durham at 101 City Hall Plaza.